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**Electronic elastic and inelastic effects in atomic-sized structures and molecules** CARLOS UNTIEDT, Dep. Fisica Aplicada. Universidad de Alicante (Spain), ROEL H. M. SMIT, GABINO RUBIO-BOLLINGER, NICOLAS AGRAIT, SEBASTIAN VIEIRA, Lab. Bajas Temperaturas. Universidad Autonoma de Madrid (Spain), JAN VAN RUITENBEEK, Kamerling Onnes Lab. Universiteit Leiden (Netherlands) — Different techniques make possible the fabrication and measurement of the properties of atomic-sized structures. In such structures new effects can be found. The control over these is crucial for the development of new methods and techniques for molecular electronics. In atomic-sized structures we have studied in depth the variations of the conductance when different bias voltages are applied. We show that there are at least, two effects: One coming from the elastic scattering of electrons at the structure and with the impurities, and a second coming from their inelastic scattering with the excitations of the lattice such as the emission of phonons. The first one gives an oscillatory dependence of the conductance with the applied voltage or size of the structure and the second gives a decrease of the conductance. This second effect allows us to extend the technique of the Point Contact Spectroscopy (PCS) to use it in atomic-sized structures. The application of the PCS to the study of atomic-sized structures acting as molecular bridges in a circuit, gives useful information. As examples we show our latest measurements for the cases in which such a bridge consists of an atom, a chain of atoms or a hydrogen molecule.

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